the fly, than when it is used as a steam engine; for if this is not done, when the groove of the fly comes to a position at right angles to a line drawn from its arbor to the axle of the engine, it will act on the crank which is before its line of motion, in such a very acute angle as to risk breaking, or displacing the axle, or itself.

This engine has no advantage over a common pump in raising water, because its pistons coming to a state of rest in each revolution, as effectually stop the momentum of the water as the alternating motion of the pump does, and there will be as much time lost in the slow part of this revolution as in the descent of the pump rod; but if by a variation in the mode of moving the cranks, each piston was made to move round alternately with a uniform velocity, while the other was at rest, then the water would be raised in a continued flow, without any loss of momentum, and the engine would be much superior to the common pump in its effects. This improvement most probably could easily be effected by the ingenious inventor.

It seems very doubtful, when the nicer workmanship of several parts requisite for Mr. Mead's engine is considered, whether he could sell those of equal powers to common steam engines for a less price, as he asserts. But this can be only determined when he publishes his prices. But let this be as it will, however Mr. Mead may exalt the merits of his engine, above all yet erected, it certainly is bordering on the presumptive, if not entirely within its limits, to declare as he has done, that no steam engine will *ever* be made superior to his. This the writer has the best reasons for denying, exclusive of the impossibility of Mr. Mead's having been able to dive into the fathomless abyss of futurity, and bring up with him an account of all possible contingencies on any subject whatsoever. The great ingenuity of the contrivance may however very well excuse this little ebullition of vanity in the inventor of this singular rotative steam engine, which from the very curious combination of its parts must give pleasure to all amateurs of mechanism.

Patent of Mr. Richard Trevethick of Rotherhithe, Engineer, and of Mr. Robert Dickinson, for a method of stowing Ships, by packages (cases) of a kind not hitherto employed, for containing goods. Dated October 1808.

Instead of the casks, chests, and various other receptacles (for containing goods, provisions, or liquors, for transportation) which are usually made of wood, the specification of this patent, proposes the introduction of iron cases, "made by casting, forging, laminating and rivetting together plates of this metal, with covers capable of being secured to them by bolts, screws, or by other means, and so as to render them impenetrable to the external air and moisture."

These iron cases are mostly made in the form of rectangular or hexagonal prisms, to prevent the waste of stowage which cylindric shapes occasion, which are never used for them, but when economy of space is not requisite.

In these iron cases it is asserted that water, oil, and various other fluids, as well as provisions of different kinds, will be better preserved from waste, putrescency, leakage, and the depredations of vermin, than in wooden vessels; and for the purposes where it is expedient, these iron cases, are tinned on the inside, or coated with a varnish, suited to the articles they are destined to contain.

In a pamphlet published by the patentees, on the advantages of their iron cases, or casks, a calculation is inserted, by which it appears, that the difference of space occupied by a ton butt of wood, and one of the iron vessels, containing an equal quantity, would be 160 gallons. A wooden water cask of this size, or containing 250 gallons, is an inch and a half thick, and has 57 gallons of solid wood, and loses at the chimes at each end 14 gallons more; making in all 71 gallons loss. But an iron cask, containing the same quantity being only three sixteenths of an inch thick, has but 7 gallons of solid iron, and having no chimes, gives an advantage of 64 gallons; besides this, the space lost between the wooden cask and those

next to it, on account of its round outline, will amount to 63 gallons more; to which is to be added a loss of space by fathom wood, stowed between the casks, equal to 35 gallons, making in all 169 gallons loss by the wooden butt; from which 7 gallons being deducted, for the solid contents of the iron in the iron cask, leaves 162 gallons in its favour against the wooden butt. Over casks of other dimensions, the iron cases will have a similar advantage.

In the package of oil in wooden casks the loss by absorption and leakage, is never less than 16 per cent; and the injurious effects of wood on malt liquors, fresh water, and other liquids, is known to every chemist.

The objections with regard to the rusting of iron vessels are answered, by the fact, that iron hoops, which are not one-third of the thickness of these vessels, and are besides exposed to the corrosive acid of the wood, last more than four years; the iron casks being three times as thick will last more than twelve years without varnish; but with this defense, the Patentees assert they will escape rust altogether.

To move these iron casks, which are square or polygonal, it is proposed to have two strong moveable hoops adapted to them which when put round them, will enable them to be rolled with the same facility as round casks.

The high price of wood for staves and the difficulty of obtaining them at present, give an additional advantage to iron casks, which can be procured at the rate of six pounds per ton, whereas the average price of wooden casks is above ten pounds per ton, and probably will increase still more.

In whale ships, wooden casks last but two voyages, but the iron ones will last ten voyages, if what the Patentees assert is true, and as they can also be filled with hot oil without loss, which the others cannot, they will have a peculiar advantage for this service.

The Patentees assert that in the navy £500,000 per annum might be saved by the use of their iron vessels for stowing water alone, and the details they have given make this highly probable.

Remarks....There can be little doubt that these iron casks would be highly serviceable for stowing biscuits, peas, flour, oatmeal, cheese, and most other kinds of dry provisions, and would preserve them effectually from injury by vermin. They would also answer well for tallow, oil, turpentine, and probably also for sugar; for holding fresh water they might succeed well likewise, and deserve a fair trial for this purpose. But whether they will do for holding salt provisions, or may be filled occasionally with salt water without damage, as the Patentees assert, or will be fit for containing beer, spirits, wine and other liquors of this nature, is extremely doubtful. For if they are ever so well varnished, the slightest crack will admit the salt liquor in the first case, and the acid fluids in the other, to penetrate a little way under the varnish, the consequence of which will be a swelling of the iron underneath, from the rust these liquors will occasion, which will force off some of the varnish in scales, a larger surface will then be exposed to the action of the liquor, and this process will be repeated, till by degrees the whole of the varnish will be detached, the iron cask entirely corroded, and the whole of the liquor spoiled. Spirituous liquors dissolve iron also, which both injures their colour and taste. As a mixture of iron with fresh water, is rather wholesome than otherwise, iron casks would probably be very fit for containing it; cast iron may be said to be already proved to be adequate for this purpose, by the vast quantity of large iron pipes, used for conveying water to London, by the New river company, which are found to last many years, and to rather improve the water.

The manner of making the casks, may be easily understood, from the account of them, inserted in the above specification. A more particular description of them would however have been given by the writer (who when in London a few months ago, went to the house of the Patentee, to request permission to see them) but

that he was refused this small favour in a very churlish manner, by Mr. Dickinson, who declared that no *wise Patentee* would ever wish his invention to be described, or remarked on in print. How far his wisdom has been consulted in the late publication of his specification in the Repertory of Arts is not apparent; but it may be that on this occasion he was overruled by his partner, Mr. Trevethick, the well known ingenuity of whose inventions on other occasions, makes it probable that he was the author of this plan for using iron casks: the merits of which, have we trust, been here discussed in the same just and impartial manner, that we have always followed: which so far from being any prejudice to Patentees, must in reality serve all those, whose intentions are honest and upright, both by the publicity it gives their inventions, and by leading to the detection of errors, the acting on which might be highly injurious, both to themselves and the public. As to Patentees who are less scrupulous about deception, and would wish to take advantage of the ignorant and unwary (though such occur much seldomer than is suspected in general) it is not very necessary to be over delicate about their opinions; on the contrary we think it the duty of every honest man that can do so, to put the publick on their guard as speedily as possible against their evil intentions

The nature of the plan for which the patent here recited has been procured, being perfectly fair, honourable and beneficial to the publick (and if it was not so, we think Mr. Trevethick would not permit his name to appear to it) it is hard to conceive the principle on which his partner should be so averse from having an account of it given in the periodical publications.

On Broom Flax, by Mr. James Hall of Walthamstow.

Phil. Mag. v.34, p.378.

To procure the flax of broom, it is only necessary to steep the twigs, or former year's branches (the most vigorous shoots of which are the best) for two or three weeks, more or less according to the heat of the weather, in stagnant water; or to boil them for about an hour in water. This done the flax comes freely from the twigs; and where there is not machinery for the purpose, may be easily peeled or stripped off by children or others, at any time when not quite dry, in the same way as hemp is peeled from the stalks. The twigs on being cleared from the flax, and steeped for some time in boiling water, become tough and beautifully white, and are worth about from a shilling to eighteen pence a pound, for making carpet brooms.

When stripped from the twigs the flax requires only to be well washed in cold water, then wrung and shaken well, and hung out to dry, previously to its being sent off to the paper manufacturers, or applied to other uses.

Mr. Hall recommends the cultivation of this plant very much to the poor of Ireland and Scotland, he has sent specimens of the broom flax to the Royal Society, to the Board of Agriculture, to the Society of Arts, to the British Musæum, and to other places.

He observes that the idea of geting flax from broom is not new;—though as he mentions it as a discovery in part of his paper, it is probable he did not know this at first; he has made many experiments relative to this flax, which have confirmed his opinion of its utility.

Remarks....The use of broom flax is very ancient in other countries, and has been long known in England; but notwithstanding this, Mr. Hall, is not without merit, for endeavouring to excite the attention of the public to what has fallen into undeserved oblivion. An extract made on this subject, more than *twenty* years ago (we believe from the Annual Register) is now in the hands of the writer, of which the following is a copy.

"The small twigs of Spanish broom give a material for making linen.

"For this purpose they must be gathered in bundles, laid in the sun to dry, then beat with a piece of